

No. 696,580.

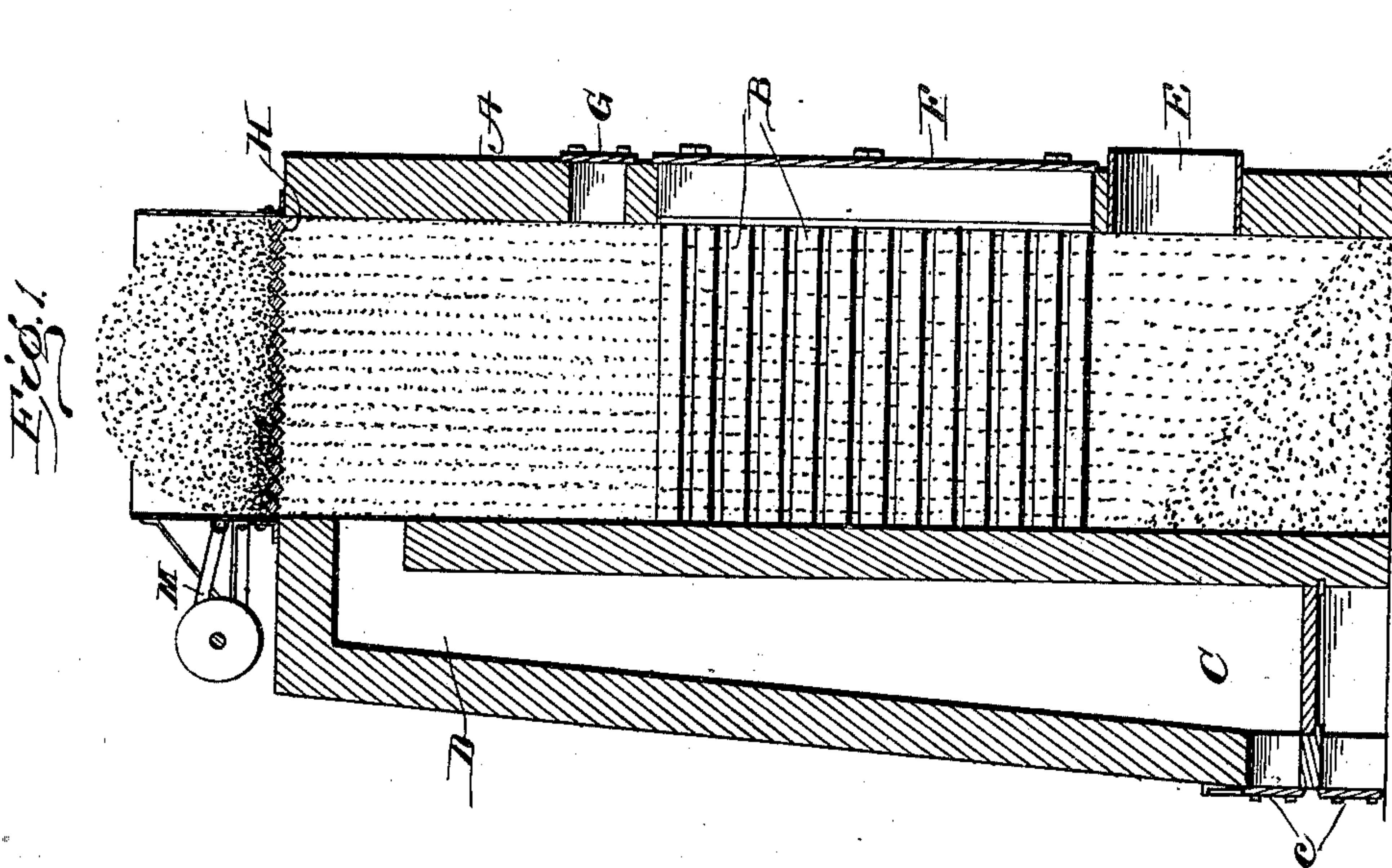
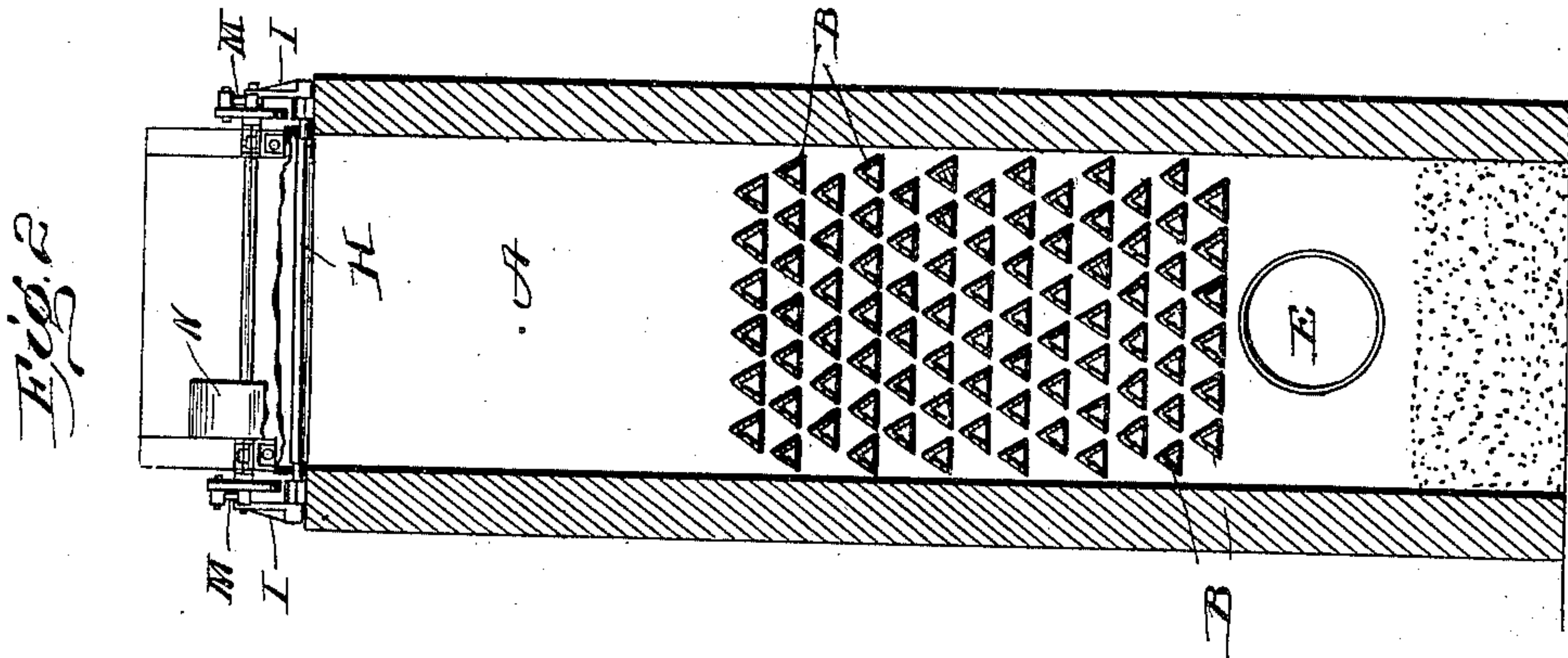
J. A. MUMFORD.
SAND DRIER.

Patented Apr. 1, 1902.

(Application filed Apr. 16, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:
J. M. Fowler Jr.
Alexander S. Stuart.

Inventor
Joseph A. Mumford
by *Charles O. Thumby*
his Att'y.

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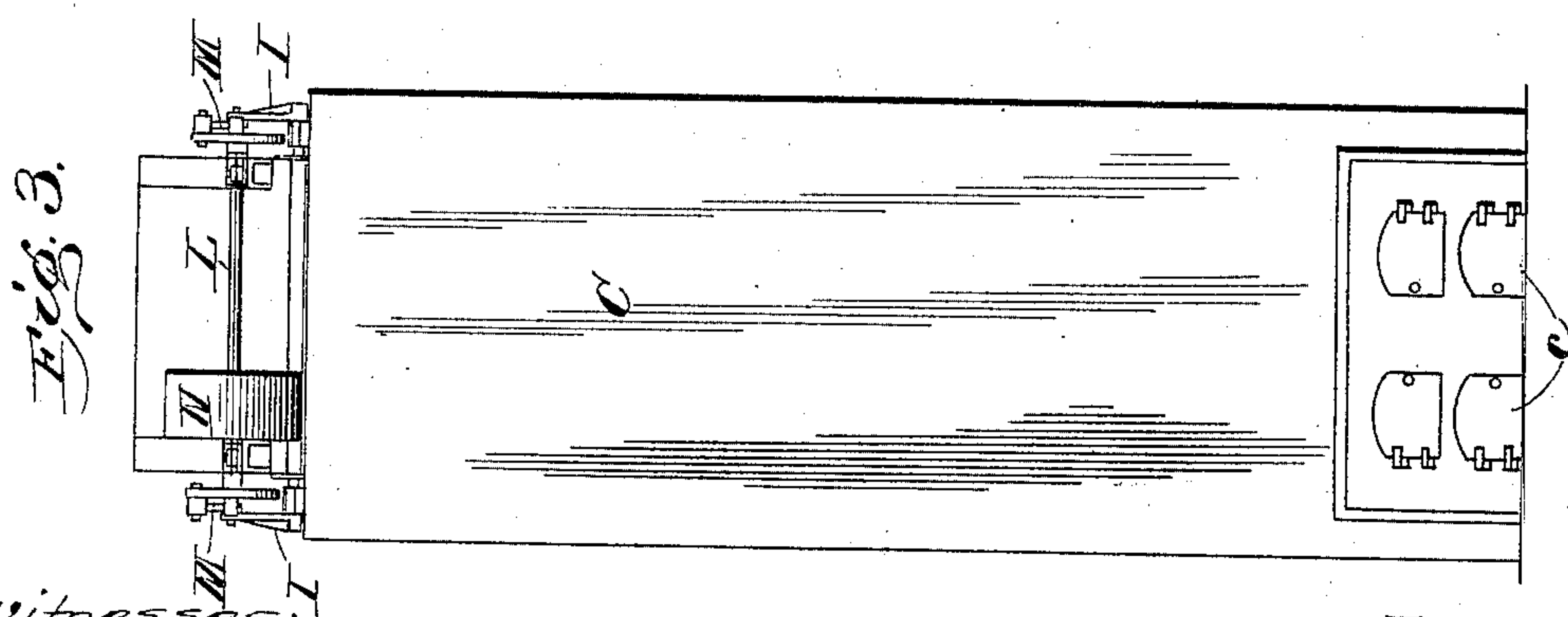
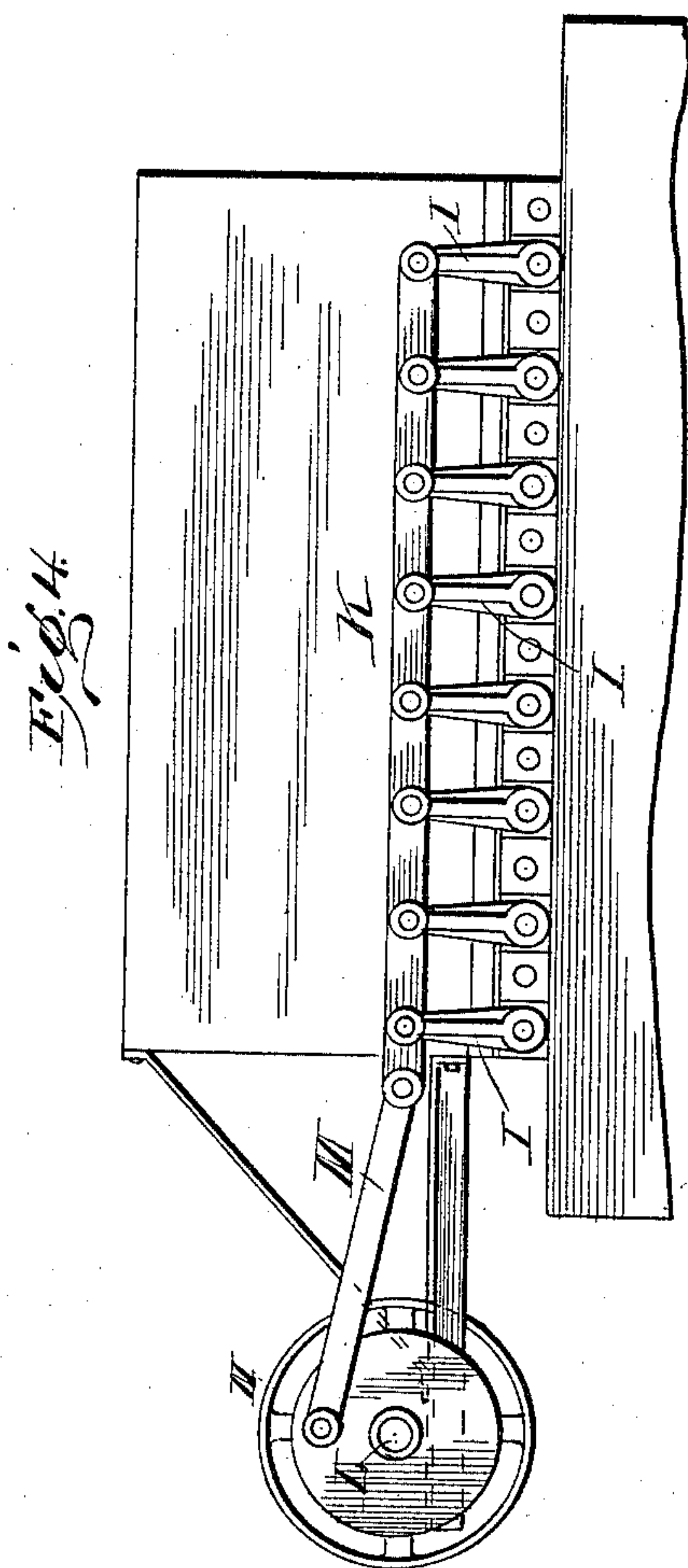
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2 Sheets—Sheet 2.



Witnesses:
J. M. Fowler Jr.
Alexander S. Stewart.

Inventor:
Joseph A. Mumford
by *Charles H. Mumford*
his Attys.

UNITED STATES PATENT OFFICE.

JOSEPH A. MUMFORD, OF ROSLYN, NEW YORK.

SAND-DRIER.

SPECIFICATION forming part of Letters Patent No. 696,580, dated April 1, 1902.

Application filed April 16, 1901. Serial No. 56,120. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH A. MUMFORD, of Roslyn, in the county of Nassau, State of New York, have invented certain new and useful Improvements in Sand-Driers; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon.

This invention relates to improvements in driers designed, primarily, for drying sand, gravel, and the like, and is of that type wherein the material to be dried drops through the apparatus by gravity.

The objects of the invention are to provide a simple, compact, and highly efficient structure in which the heated gases, &c., from the fire may be employed directly to dry the material uniformly and with a minimum waste or escape of the heated or expanded air or gases without being charged with moisture from the sand or other material.

Referring to the accompanying drawings, Figure 1 is a vertical section through a drier embodying my present improvements. Fig. 2 is a section at right angles to Fig. 1. Fig. 3 is a front elevation, and Fig. 4 is a detail side elevation, showing the operating mechanism for the feeder.

Like letters of reference in the several figures indicate the same parts.

In constructing a drier in accordance with the present invention it is one of the objects to bring the heated gases from the furnace directly into contact with the sand or material to be dried while the latter is in as finely-subdivided condition as possible and to prolong such contact as long as possible, whereby the moisture is taken up by the heated gases and the sand or material is allowed to escape in condition for use, and, further, to so arrange the structure that the destructible parts will be protected against the injurious action of the heated gases and products of combustion, thereby materially prolonging the life of the structure and maintaining the same in operative condition.

Referring to the accompanying drawings, the letter A indicates a vertical stack or chamber having at a suitable point near its bottom baffle or deflecting plates B, preferably

wedge-shaped, with the apex upwardly, so as to deflect material falling thereupon from one to the other, retarding its downward progress to a certain extent and prolonging the contact of the material with the air or gases within the chamber. At the bottom of the chamber a suitable exit opening or passage for the escape of the material is formed, while at the top of said chamber is a feeding mechanism adapted to shower the material down through the chamber in a subdivided condition, the feed taking place by gravity and the rate of feed being determined by the openings in or degree of agitation of the feeding mechanism, as will be presently described.

At one side of the chamber or stack A is a furnace C, which may be supplied with fuel and the ashes withdrawn through suitable fire and ash-pit doors *c*, of any usual or preferred construction. From the furnace C the gaseous products are carried upwardly along-side of the stack A to a point near the top of said stack or to a point immediately beneath the material-feeding mechanism, where said passage or flue D opens into the stack A, discharging the products and heated gases directly into the stack and through and into the material being showered down by the feeding mechanism, such products of combustion and heated gases being thence drawn downwardly, together with said material remaining in contact therewith, to a point below the baffle-plates B and being thence allowed to escape through a smoke or gas exit E, which may lead off to a suitable stack or other exhaust or draft creating means, which will insure a sufficient draft to maintain combustion in the furnace and a uniform steady downdraft through the stack A or through the stack in the direction in which the sand or material to be dried travels.

In the operation of a drier as thus described it will be seen that inasmuch as the material is supplied in a wet condition the heated gases and products of combustion come in contact therewith when said material is in its wettest and coldest condition, the result being that the maximum amount of moisture is quickly taken up by said gases and while the material is in free transit therethrough from the feeding mechanism to the baffle-plates and that by the retardation of the said ma-

material in passing the baffle-plates both said material and the gases are brought to a uniform temperature, and in theory the said material may be discharged practically in condition ready for use, although in practice it is not necessary to establish such a perfect condition of operation. By allowing the material to come in contact with the baffle-plates only after it has been subjected to the action of the heated gases said material is dried sufficiently to prevent any possible clogging or adherence to said baffle-plates, and as a result no agitation of the material in its passage over the baffle-plates is needed to keep the apparatus at all times clear and in working condition; but in case it is desired to clean said baffle-plates or the chamber above the same, provision is made for opening the stack at the front side by means of doors F and G, although other well-known means for accomplishing this end may be employed.

The feeding mechanism before referred to preferably consists of a series of rectangular or square bars H, suitably supported in bearings at each side of the stack A near its upper end and having operating-arms I connected with their ends outside of the stack, said operating-arms I being in turn jointed to an operating-rod K, extending off to one side and adapted to receive reciprocatory motion, preferably from a crank-shaft L, through a link connection M, said shaft receiving its rotation by means of a pulley or drive-wheel N of an improved type. Obviously the bars H may have their operating-arms I at one side or the other of the stack, and in practice it is preferred that alternate bars should have their operating-arms at opposite sides of the stack, as will be readily understood from an inspection of Fig. 3, so as to provide for sufficient clearance when the arms are given a large radius of action.

The apparatus may be adapted for the handling of coarser or finer material, such material in every instance, however, being broken up and showered down through the stack A in the fine subdivided condition, so that every particle thereof may be acted upon and its moisture taken off by the heated gases which come into direct contact therewith. The cold wet material lying on the bars H, together with the material being passed through said bars, will prevent the destructive action of the gases thereon, and by reason of the remoteness of the baffle-plates from the point

of entrance of said gases said baffle-plates will be similarly preserved, whereby in practice the life and efficiency of the structure will be materially prolonged.

In operation the material is simply loaded on the bars H and the feeding mechanism set in operation, the escape of gases and products of combustion through the bars H being prevented by the superimposed bulk of material to be fed through the stack. The accumulation of material at the bottom of the stack will prevent the escape of the gases and products of combustion through the opening for the discharge of the material, although, if desired, a suitable door or other closure may be provided at this point, but is not deemed necessary in ordinary operation.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A sand-drier embodying the following construction, to wit, a vertical stack, a furnace located near the base of the stack and having a flue leading into the stack near the upper end, a discharge-flue leading from the stack near the bottom, whereby the products of combustion pass to the top of the stack and thence down through the stack to the exit-opening, a showering mechanism for feeding sand into the stack above the furnace-flue, and baffle-plates located above the discharge-flue and a sufficient distance below the furnace-flue opening to permit the sand to travel in the direction of and with the downwardly-moving gases before striking the baffle-plates, whereby the sand is dried sufficiently to prevent stoppage of the spaces between the plates, substantially as described.

2. A sand-drier embodying the following characteristics, to wit, a mechanism for showering sand, a vertical stack having a straight passage down through which said sand is showered in a free state, a furnace opening into the upper part of said passage, an exit-opening from the lower part of the stack whereby the heated products are caused to travel in the same direction and with the sand while descending freely in the stack and baffle-plates for arresting the direct fall of the sand; substantially as described.

JOSEPH A. MUMFORD.

Witnesses:

CHAS. A. FOX,

CHAS. C. RANDOLPH.